

We Claim:

1. An etch mixture for silicon comprising a fluorine-containing gas selected from the group consisting of  $\text{SF}_6$ ,  $\text{Si}_2\text{F}_6$  and  $\text{SiF}_4$  together with HBr and oxygen.

2. An etch mixture according to claim 1 wherein the mixture additionally includes a noble gas.

3. An etch mixture according to claim 1 wherein the mixture contains  $\text{SF}_6$ .

4. An etch mixture according to claim 3 wherein the mixture additionally includes  $\text{Si}_2\text{F}_6$  and  $\text{SiF}_4$ .

5. An etch mixture according to claim 3 wherein the volume ratio of  $\text{HBr}:\text{SF}_6$  is 0.1 to 10.

6. An etch mixture according to claim 3 wherein the volume ratio of HBr and  $\text{SF}_6:\text{O}_2$  is 0.1 to 10.

7. A method of etching deep, straight walled, rounded bottom openings in silicon comprising plasma etching a silicon substrate with an etch mixture comprising a fluorine-containing gas selected from the group consisting of  $\text{SF}_6$ ,  $\text{Si}_2\text{F}_6$  and  $\text{SiF}_4$  together with  $\text{HBr}$  and  $\text{O}_2$  in a plasma vacuum chamber, said silicon substrate mounted on a support electrode connected to an RF power source.

8. A method according to claim 7 wherein the fluorine-containing gas is  $\text{SF}_6$ .

9. A method according to claim 7 wherein the volume ratio of  $\text{HBr}:\text{SF}_6$  is from 0.1 to 10.

10. A method according to claim 7 wherein the volume ratio of  $\text{HBr}$  and  $\text{SF}_6:\text{O}_2$  is from 0.1 to 10.